



PePWave Mesh Connector

User Manual

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3 Product Description

PePWave Mesh Connector is a Wi-Fi Station Mode (Client) Bridging Modem with WPA and WPA2 supplicant support. It is specially designed to act as a Transparent Wireless Bridge which connects to Wireless Broadband Internet Service and allows LAN users to transparently access the Internet via it.

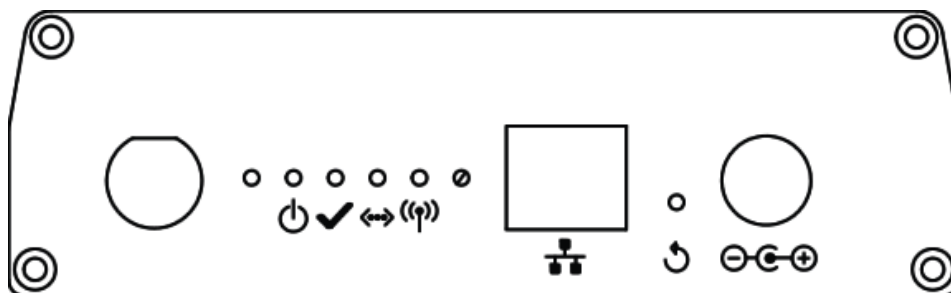
It associates to a service provider and authenticates using 802.1x, if required, on start up. Upon successful association and authentication, it will acquire an IP address from the service provider using DHCP. With a switch connected behind it, the Mesh Connector supports multiple terminals to simultaneously access the Internet.

3.1 Features

- 10/100 Ethernet interface with auto-crossover detection
- High Power indoor access point and adjustable transmit power
- WPA/WPA2-Personal and WPA/WPA2-Enterprise support
- Specially designed for transparent Internet access

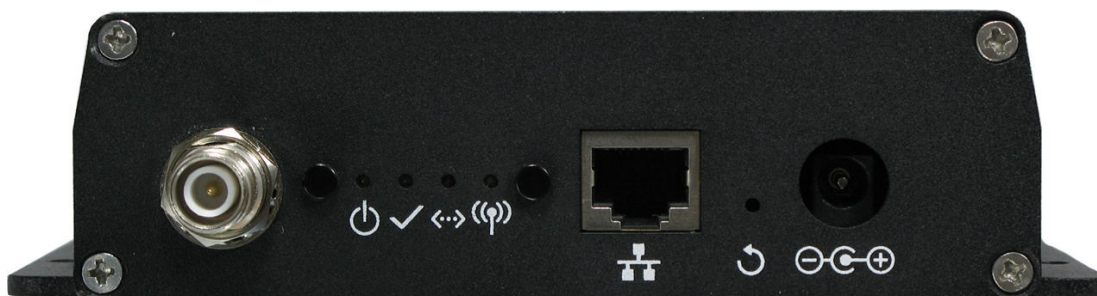


3.2 Hardware Setup



1. Attach the antenna provided to the left most antenna connector
2. Connect the LAN port to the computer Ethernet port with an Ethernet cable.
3. Connect the end of the included power adapter to the power socket on PePWave Mesh Connector.
4. Power on the power adaptor.

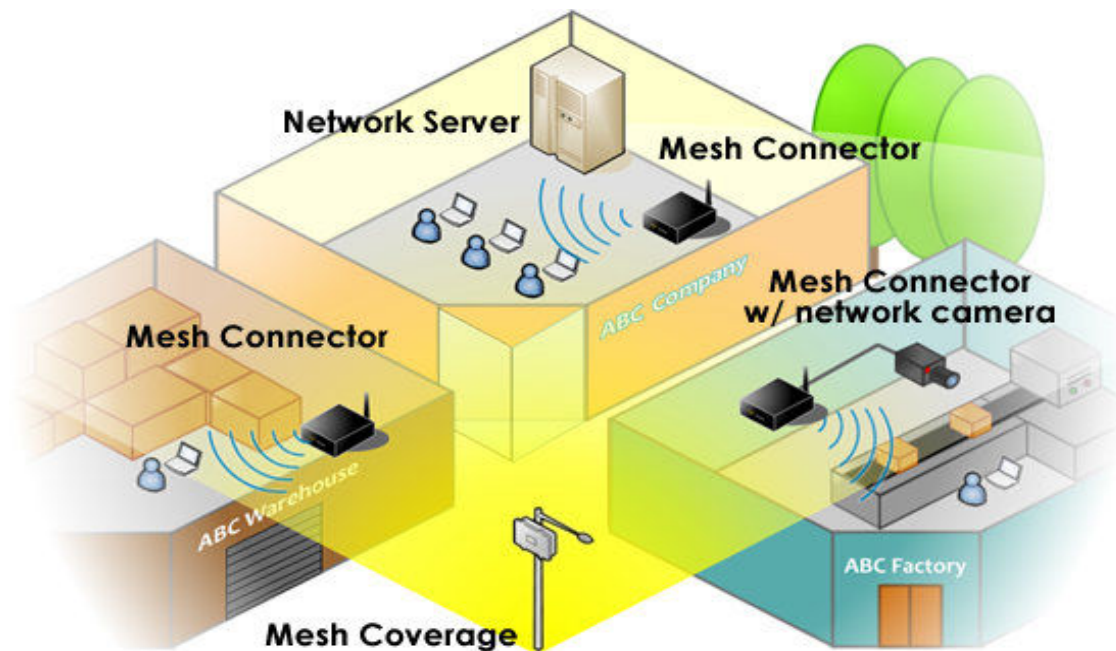
3.3 LED Description



LED	Color	Status	Description
 Power	Green	On	Power is on
		Off	Power is off
 Status	Green	On	Received Wi-Fi signal
		Off	Booting up / Upgrading firmware
 LAN	Green	On	Ethernet is connected
		Off	Ethernet is not connected
 Wi-Fi	Green	On	Associated with an access point
		Off	Not associated with any access point

3.4 Extend Wi-Fi Coverage – Introduction

High power indoor access point functionality of Mesh Connector 200/400 provides strong transmit power to facilitate enhanced Wi-Fi signal penetration. With Mesh Connector units, users can roam about freely within the expanded coverage area without any interrupted service or IP address change.



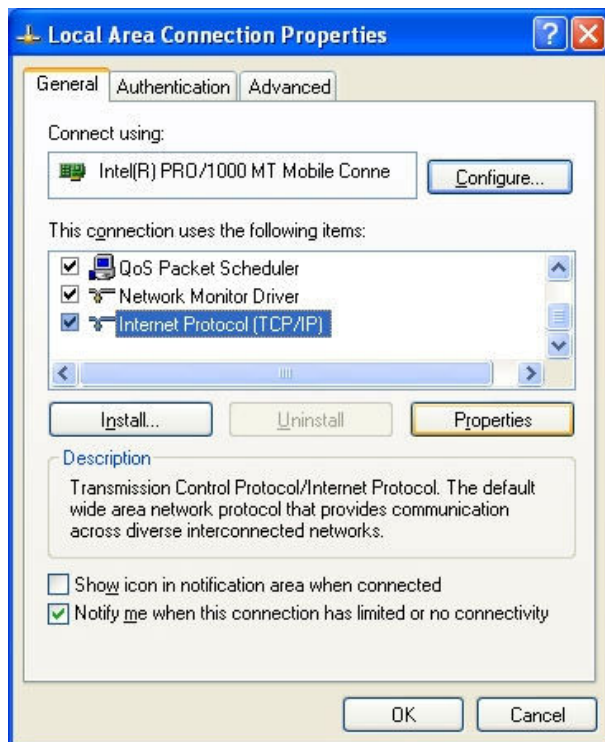
PePWave Mesh Connector units in Work Places, Warehouse and Factory

4 Using the PePWave Mesh Connector

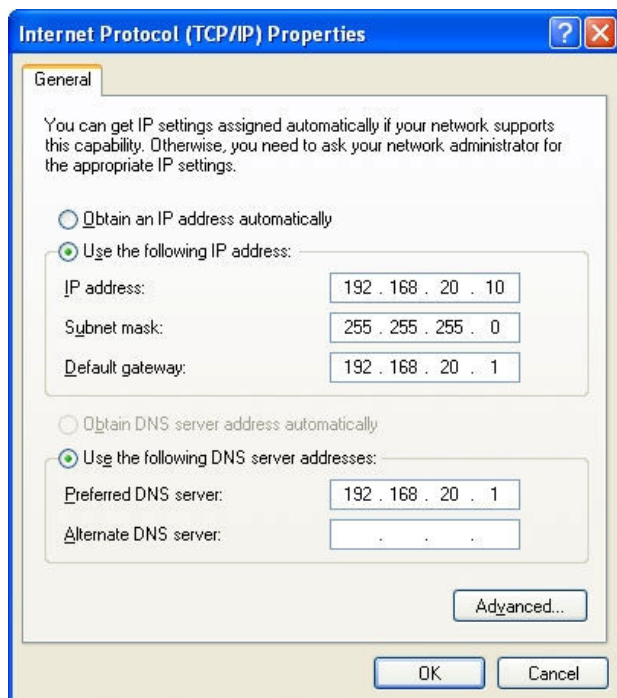
4.1 Pre-configuring PC Setup

Prior to the PePWave Mesh Connector configuration, a computer with its Local Area Connection set to a static IP address is required to pre-configure to the same subnet as the Mesh Connector (i.e. 192.168.20.X).

In order to do so, select the "Start" menu, "Control Panel" and then "Network Connections". Right click on the "Local Area Connection" icon, choose "Properties", and double click on the item "Internet Protocol (TCP/IP)" from the list as shown in the diagram below:



An 'Internet Protocol (TCP/IP) Properties' screen will pop up and set it as follows:



Click the "OK" button to confirm the change.

Now you are ready to start the first time configuration of the PePWave Mesh Connector.

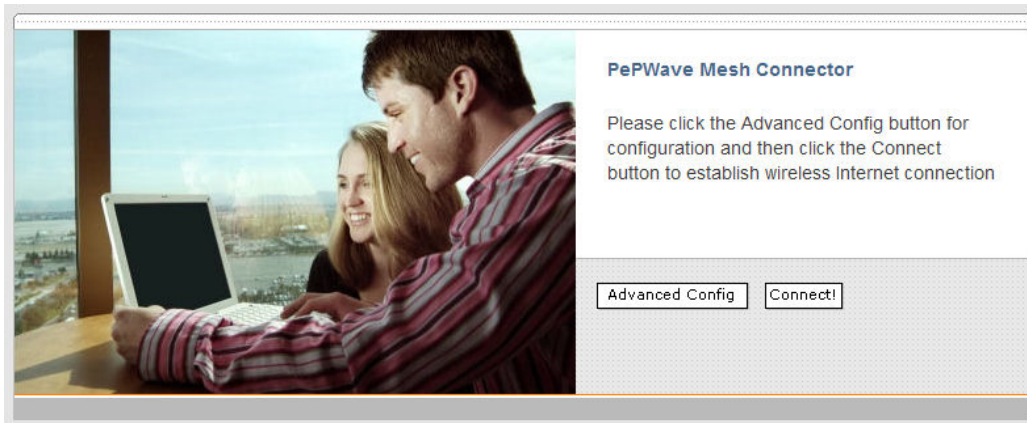
4.2 First Time Setup

On your PC, start a web browser, e.g. Internet Explorer, Mozilla Firefox, etc.

Enter the URL as follows:

<http://192.168.20.1/>

The page will look like this.



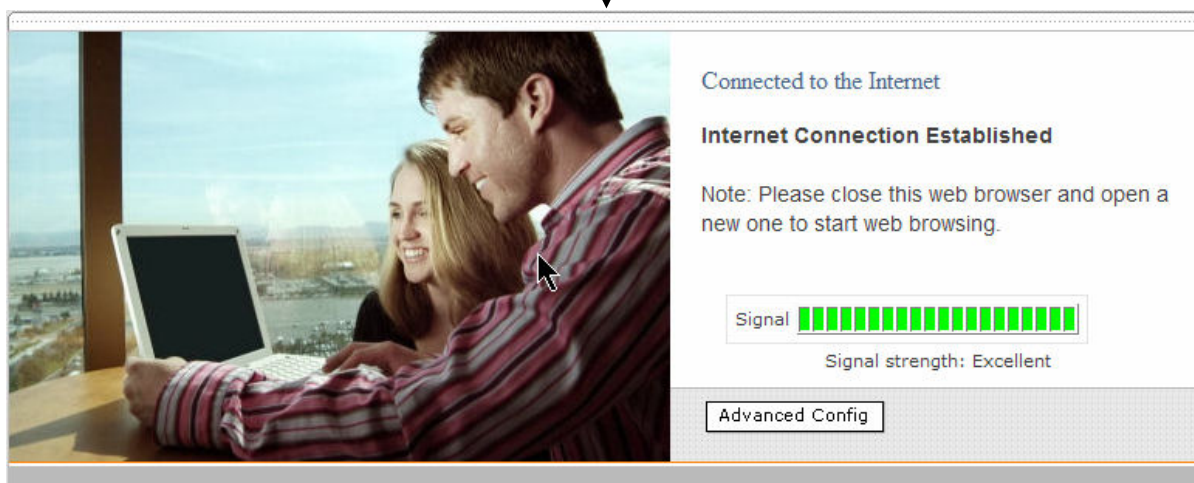
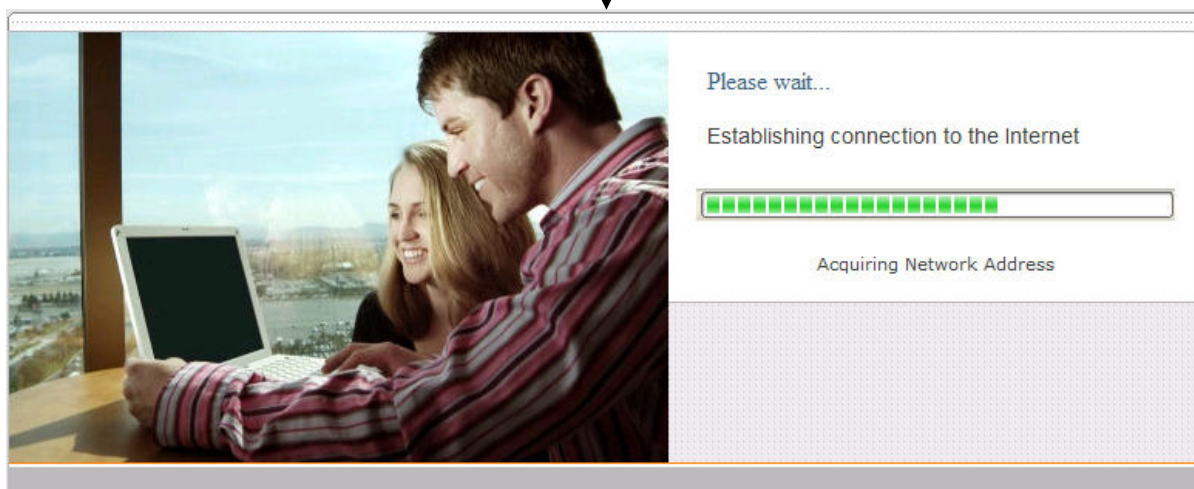
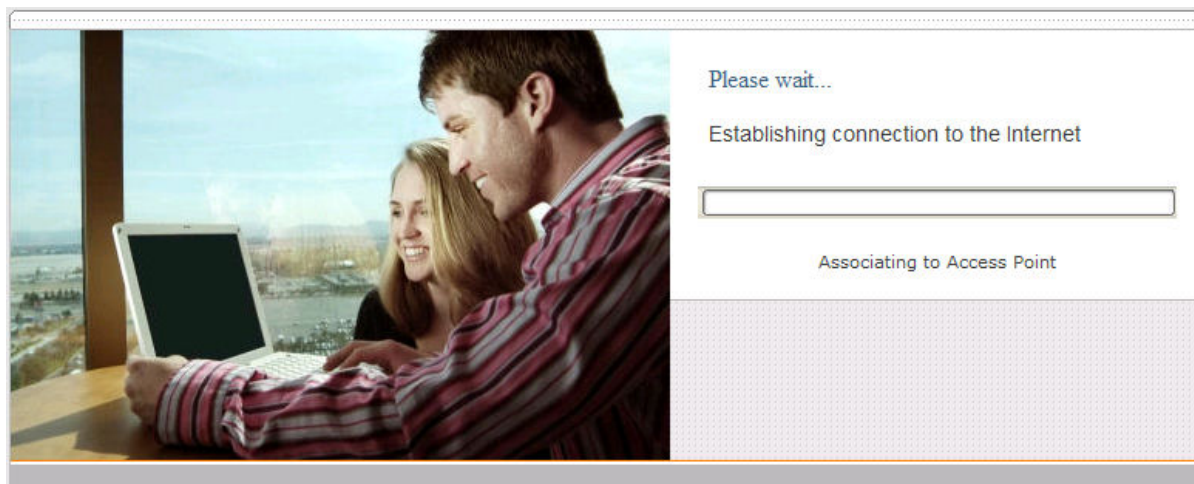
Click the "Advanced Config" button to enter the parameters of the access point to associate to. You should see this screen:

In the field "SSID" under Wireless Settings, input the access point's SSID (sometimes it is called the "network name"). According to the setting of the Access Point you are associating to, you may choose a different "Authentication setting".

If "Static WEP key" or "WPA/WPA2-Personal" is selected for Authentication, input the Encryption Key field as well. If "WPA/WPA2-Enterprise" is selected, please refer to 4.3.5 for more detail.

Click the "Save" button at the bottom to complete.

You can now click the "Connect" link on the top bar and then click the "Connect" button to associate with the access point.



At this point, the Mesh Connector is associated with the access point. You may now close the web browser and reconfigure your computer with its Local Area Connection set to 'Obtain an IP address automatically'. Please refer to section 4.5 (Post-configuring PC Setup).

4.3 Settings Details

PePWave Mesh Connector is configured via the **CPE Setup** tab. The following sections will provide information as a guide through the configuration.

4.3.1 Wireless Settings

LAN Interface	IP Address	192.168.20.1
	Subnet mask	255.255.255.0

LAN Interface: To configure the LAN interface's IP address and subnet mask.

SSID: To configure the SSID / ESSID / Network Name of the wireless network to associate to.

Radio Mode: It allows the user to choose between radio modulations support for example, 802.11b/g, 802.11g only, 802.11b, etc. The available settings depend on the Wi-Fi module installed on the device.

Note: Under 802.11g only mode, 802.11b rates are used during access point association.

Bit Rate: This setting can fix the 802.11 transmit bit rate. Available options depend on the Radio Mode chosen. If "auto" is chosen, the device will choose the best bit rate dynamically and automatically.

Wireless Settings	SSID	MySSID (MySSID)
	Radio Mode	802.11b/g
	Channel Scanning Mode	Full
	Bit Rate	auto Mbps (auto)
	Authentication	Open
	Encryption Key	None
	Preferred AP	MAC (e.g. 00116E1014A0) Min Signal Strength dBm (e.g. -75)

Authentication: Available options are Open, Static WEP Key, WPA/WPA2-Personal, and WPA/WPA2-Enterprise. The selection should correspond to the setting of the access point you are associating it to. The transferred data is then encrypted under all modes except in Open mode. When Static WEP Key or WPA/WPA2-Personal is chosen, you should enter an encryption key in the Encryption Key field. When WPA/WPA2-Enterprise is chosen, the specified radius server settings are required.

Preferred AP: The MAC address of a preferred access point can be entered here. First, the preferred access point is found and its signal strength must be higher than the "Min Signal Strength." Then it will connect to this preferred access point regardless of the other access points found, even if they have higher signal strengths or the same SSID.

IP Settings	☒ Configure Manually	
	IP Address	0.0.0.0
	Subnet Mask	0.0.0.0
	Default Gateway	0.0.0.0
	Preferred DNS Server	0.0.0.0
	Alternate DNS Server	0.0.0.0
	☐ Obtain an IP Address automatically	
MTU Size		1500

IP Settings: The IP address can be obtained automatically or configured manually. If you choose to manually configure the IP address for your unit, enter the fields "IP Address", "Subnet Mask", "Default Gateway", "Preferred DNS Server" and "Alternate DNS Server".

MTU Size: You may also set the MTU Size to increase the data packet size your Mesh Connector can handle at one time.

WAI Redirection	☒ Enable ☐ Disable (Note: you need to reboot CPE for this change to take effect)
Web Password Protection	☐ Enable ☒ Disable Password ***** (admin) (Note: login name is "root")
Restore Factory Settings	Restore & Reboot
Reboot CPE	Reboot

WAI redirection: If the device is not connected to an access point, and the user is accessing an Internet web site, the settings control whether or not to redirect web access to the web admin interface page. If this feature is disabled and the device is not connected, the browser will show a web access error message. The user can still access the web admin interface by accessing to the device's LAN IP address. By default, the LAN IP address is set as http://192.168.20.1.

Web Password Protection: If this feature is enabled, users will be required for login name and password to the Advanced Config page. The default login name is *root*, and the default password is *admin*.

Restore Factory settings: To restore the device to default settings. When this option is clicked, default settings will be restored and the unit will be restarted.

Reboot CPE: To restart the device.

4.3.3 Available Access Point Settings

The available Access Point (AP) settings for the Integrated Indoor Wi-Fi Access Point functionality are as follows:

- **Disable**

Integrated Indoor Wi-Fi Access Point functionality is disabled

- **Configure Manually**

Manual configuration of the SSID, Authentication, and Encryption Key values corresponding to the Access Point.

- **Configure Automatically**

The SSID, Authentication, and Encryption Key values corresponding to the Access Point are automatically configured to be the same as the respective values that correspond to Citywide Wi-Fi.

4.3.4 Access Point Disabled

AP Settings	☒ Disable	
	☐ Configure Manually	
	☐ Configure Automatically	
	AP Transmit Power Adjustment	default (default)

Access Point disabled, as shown with the red marker box

4.3.5 Manual Access Point configuration

AP Settings	☐ Disable	
	☒ Configure Manually	
	AP SSID	Indoor_SSID (Indoor_SSID)
	Authentication	Open (open)
	Encryption Key	None
	Broadcast SSID	☒ Enable ☐ Disable
	☐ Configure Automatically	
	AP Transmit Power Adjustment	default (default)

Manual Access Point Configuration, as shown with the red marker box

In Manual Configuration mode, the **SSID** is manually entered.

Authentication can be one of three configurable values:

- **Open**

For **Open** Authentication Mode, no Encryption Key is necessary.

- **Static WEP Key**

For **Static WEP Key** Authentication Mode, a 64- or 128-bit Encryption Key is required, and can be entered in either an ASCII or HEX representation.

AP Settings	☐ Disable	
	☒ Configure Manually	
	AP SSID	Indoor_SSID (Indoor_SSID)
	Authentication	Static WEP Key (open)
	Encryption Key	***** (empty) ASCII: 5 characters for 64-bit, 13 characters for 128-bit HEX: 10 characters for 64-bit, 26 characters for 128-bit [0-F]
	Broadcast SSID	☒ Enable ☐ Disable
	☐ Configure Automatically	
AP Transmit Power Adjustment	default (default)	

Static WEP Key Authentication Configuration

- WPA/WPA2-Personal**

For **WPA/WPA2-Personal** Authentication Mode, an Encryption Key, of at least 8 characters, is required.

AP Settings	☐ Disable	
	☒ Configure Manually	
	AP SSID	Indoor_SSID (Indoor_SSID)
	Authentication	WPA/WPA2-Personal (open)
	Encryption Key	***** (empty) (at least 8 characters)
	Broadcast SSID	☒ Enable ☐ Disable
	☐ Configure Automatically	
AP Transmit Power Adjustment	default (default)	

WPA/WPA2-Personal Authentication Configuration

- WPA/WPA2-Enterprise**

For **WPA/WPA2-Enterprise** Authentication Mode, Radius Server information is needed.

In the **Radius Server Host** field, enter the server IP address specified for authentication and accounting. Then enter the **secret** for accessing the Radius server.

Authentication Port specifies the UDP port number for the Authentication port of the Radius server. **Accounting Port** specifies the UDP port number for the Accounting port of the Radius server.

AP Settings	☐ Disable	
	☒ Configure Manually	
	AP SSID	Indoor_SSID (Indoor_SSID)
	Authentication	WPA/WPA2-Enterprise (open)
	Encryption Key	None
	Radius Server Host	0.0.0.0 (0.0.0.0)
	Radius Secret	empty (empty)
	Authentication Port	1812 (1812)
	Accounting Port	1813 (1813)
	Broadcast SSID	☒ Enable ☐ Disable
	☐ Configure Automatically	
	AP Transmit Power Adjustment	default (default)

WPA/WPA2-Enterprise Authentication Configuration

Broadcast SSID can be one of two configurable values:

- **Enable**

The configured SSID will be broadcast such that it can be detected by an SSID scan.

- **Disable**

The configured SSID will not be broadcast such that it cannot be detected by an SSID scan. In order to connect with the access point, the SSID needs to be known by the client.

By default, **the AP Transmit Power Adjustment** is set around 15dBm. The user-defined transmit power would optimize your access point coverage range.

AP Settings	☐ Disable	
	☒ Configure Manually	
	AP SSID	Indoor_SSID (Indoor_SSID)
	Authentication	Open (open)
	Encryption Key	None
	Broadcast SSID	☒ Enable ☐ Disable
	☐ Configure Automatically	
	AP Transmit Power Adjustment	-8 dB (default)

Automatic Access Point Configuration

AP Settings	☐	Disable	
	☐	Configure Manually	
	☒	Configure Automatically	
		AP Transmit Power Adjustment	default v (default)

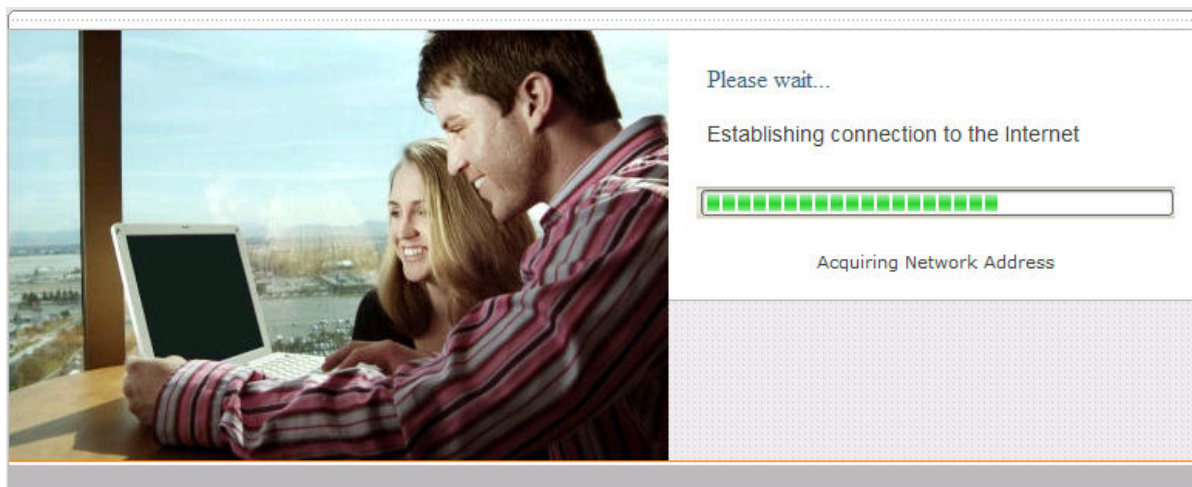
Auto. Access Point Configuration, as shown with the red marker box

With the Access Point Configuration set to **Configure Automatically**, the **SSID**, **Authentication**, and **Encryption Key** values of Integrated Indoor Wi-Fi Access Point will be configured to be the same as in the **Wireless Settings** section.

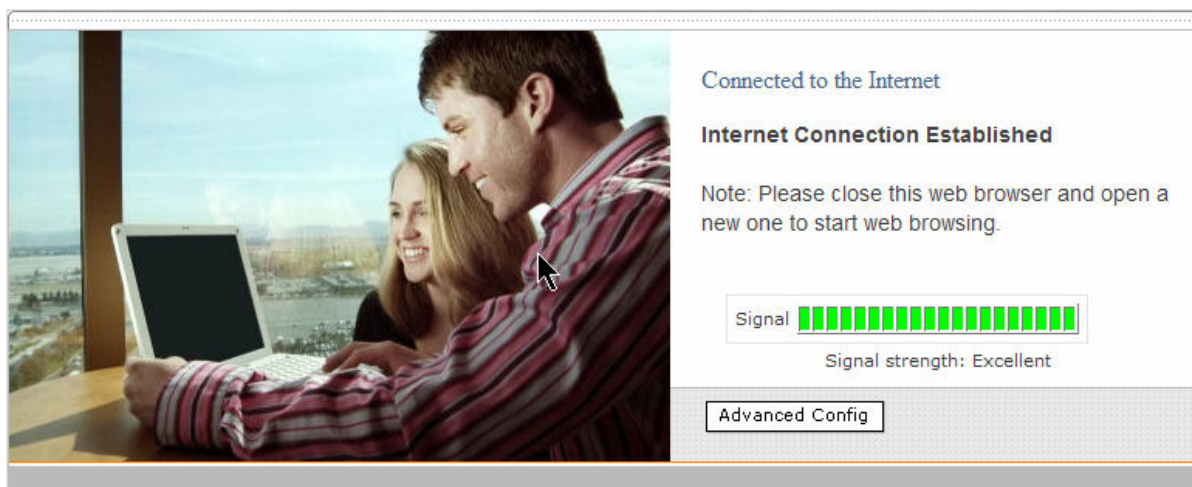
This configuration mode is effectively equivalent to directly connecting 802.1b/g devices on the customers' premises with Citywide Wi-Fi.

4.4 Test the Setup

To test the setup, navigate to the PePWave Mesh Connector main page and enter the user name and password. The realm (the text box next to the "@" sign) value can be left empty. Then click the Connect button.



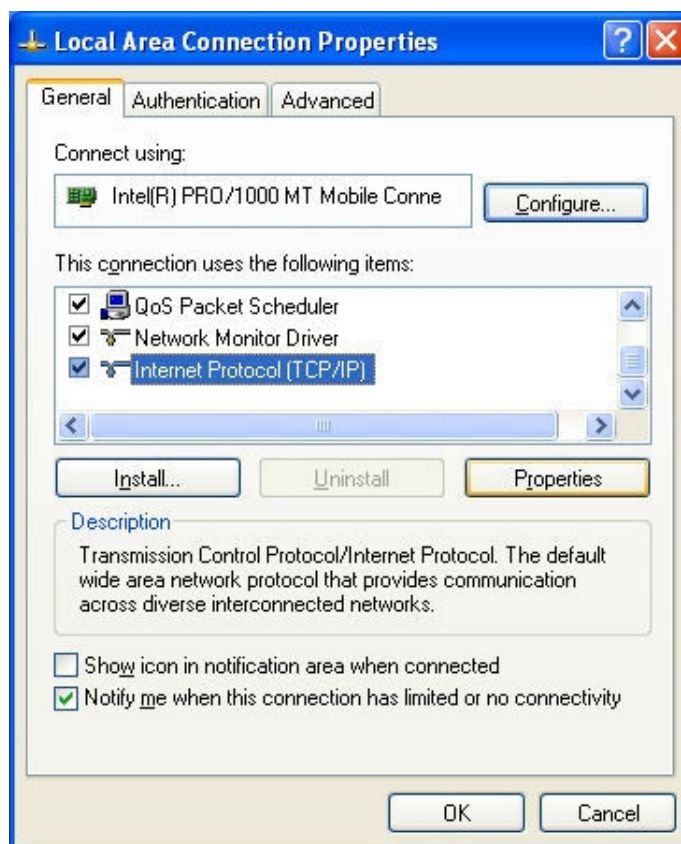
After being connected, you should see:



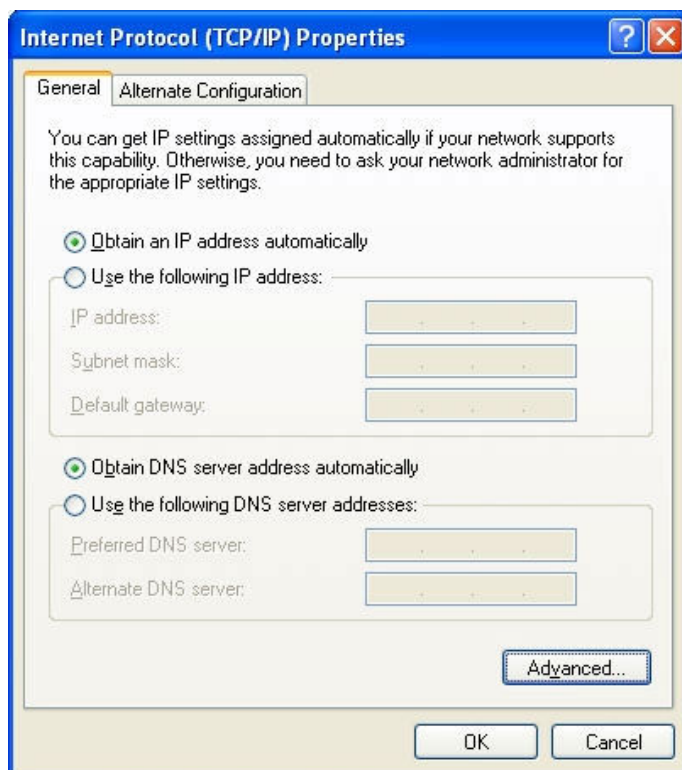
4.5 Post-configuring PC Setup

At this point an Internet connection should have been successfully established between the access point and the Mesh Connector. The PC that was previously pre-configured to administrate the Mesh Connector has to reconfigure its Local Area Connection and be set to 'Obtain an IP address automatically'.

Similar to the 'Pre-configuring PC Setup' (Section 4.1), select the "Start" menu, "Control Panel" and then "Network Connections." Right click on the "Local Area Connection" icon, choose "Properties," and double click on the item "Internet Protocol (TCP/IP)" from the list as shown in the diagram below:



An 'Internet Protocol (TCP/IP) Properties' screen will appear. Please set as follows:



Click the "OK" button to confirm the change.

For now the PC will send a DHCP request directly to the access point via the PePWave Mesh Connector, and an IP address will be assigned from the access point to the PC.

4.6 Firmware Upgrade

The PePWave Mesh Connector can automatically check for an available firmware version that is more updated than the software currently running on the Mesh Connector. This can be done in the Firmware Upgrade section.

However, it is recommended that you do not update the firmware unless specifically instructed by your ISP to do so. When a firmware upgrade is needed, your ISP will either give you instructions or upgrade the firmware remotely.

4.7 Restore to Default Settings

There are two ways to restore the PePWave Mesh Connector to default settings.

If you are able to access the web admin interface, go to the "CPE Setup" page, and click the "Restore and Reboot" button.

Otherwise, you can also power up the unit and wait for approximately 1 minute. Then press the Reset button at the rear side of the unit using a pin and then hold it for 5 seconds. The unit will restore the settings to factory default and reboot.

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